mice, hard-boiled egg, and cockroaches. It left the nest at a month old, and at five weeks old may be described as follows:—

Upper parts pale brown, darker and with a rufous shade on the mantle, the rump and upper tail-coverts being dark brown. The crown of the head and neck barred with dark brown; the wings also covered with fine wavy lines of dark brown on a paler ground.

The abdomen and under tail-coverts whitish.

The bill very dark brown, the legs and feet dark grey, and the iris very pale silvery grey.

EXPLANATION OF PLATE LXIX.

Fig. 1. Young *Cariama cristata* 24 days old, in nest.
Fig. 2. „ „ „ 30 days old, with parent.
Figs. 3 & 4. „ „ „ 2 months old.

PAPERS.

30. On a rare Stag (*Cervus wallichii*) from Nepal recently presented to the Zoological Society by His Majesty King George. By R. I. Pocock, F.R.S., F.L.S., F.Z.S., Superintendent of the Gardens.

[Received March 19, 1912: Read April 2, 1912.]

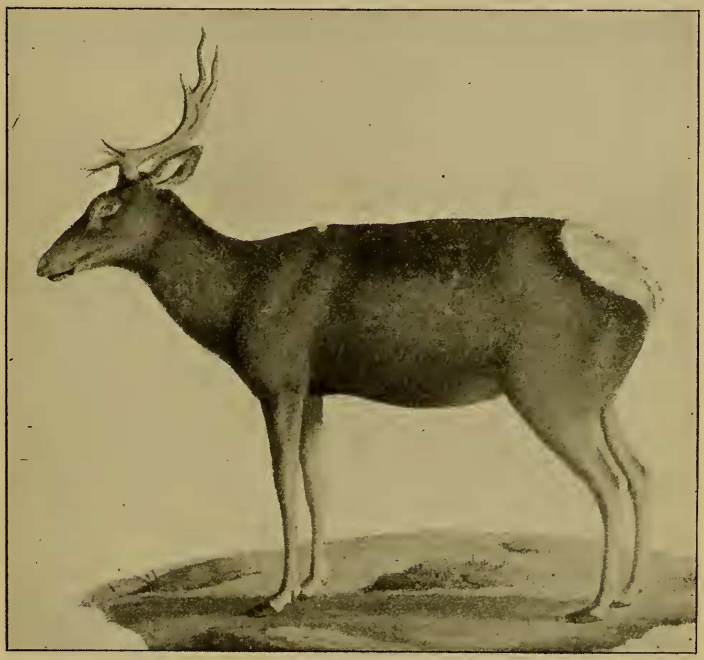
(Text-figures 66–71.)

INDEX.

From the scientific standpoint the most interesting animal in the collection from Nepal presented by H.M. the King to the Zoological Society was a large Stag belonging to a species (*Cervus wallichii*) which has never been previously exported alive from India, and, so far as available records show, has never been shot or preserved by any English sportsman, and is therefore unrepresented in any of the large museums of the world. The arrival of this specimen, moreover, has made it possible to classify a species which for nearly a century has been a puzzle to all systematic workers on the Deer.

Cervus wallichii was described by G. Cuvier (Rech. Oss. Foss. ed. 3, iv. p. 504, 1825 *; ed. 4, vi. pp. 88–89, 1835) from a native sketch, sent to him by Duvaucel, of an animal, one of a pair, according to Blyth, living in the menagerie at Barrackpore and said to have come from Muktinath, north of Dwalagiri in Nepal †. This sketch was reproduced by F. Cuvier & Geoffroy St. Hilaire (Hist. Nat. Mamm. iv. no. 356, 1823), and modifications of it were reproduced subsequently by Jardine ‡ and Hamilton Smith §.

Text-fig. 66.



Cervus wallichii.

Photograph of Cuvier's figure of the type-specimen.

The main characters of the animal are made clear by the descriptions and figures of the French authors. It was described as dark grey-brown or yellowish grey-brown with pale legs, a

* I have not seen this edition.—R. I. P.

† In support of this Blanford (Mamm. Brit. India, p. 538), copying Blyth, cites Hardwicke (Tr. Linn. Soc., Zool. xiv. p. 581, 1823). Hardwicke, however, does not there state that the stag from Muktinath he identified as '*C. pygargus*, Pall.' was the type from which the sketch was taken. The coincidence of the dates, however leaves little doubt on this point.

‡ Naturalistst's Library, iii. pl. 10, p. 161, 1835.

§ Griffith's Animal Kingdom, iv. p. 103, pl., 1827.

very short white tail and *a large white disk upon the croup* *. The figure shows no less clearly that the caudal disk in size and extension over the croup, reaching nearly to its summit, resembled that of a Wapiti but was white instead of yellowish buff in colour. The antlers were short, only a little exceeding the head in length, and carried a brow and a bez tine, the beam being simply forked and the trez tine absent. The brow and bez tines were close together at the base and diverged at about an angle of 45°, the brow tine projecting straight forwards and the bez inclining obliquely upwards. The beam, which receded at an obtuse angle of about 135° from the bez, appears from the figure to have formed a fairly regular arch, there being no indication that either of the terminal tines was turned inwards.

For reasons given below I am quite of Hamilton Smith's opinion (Griffith's An. King. iv. p. 103, 1827) that these antlers show the stag to have been an old animal at the time the illustration was made.

A pair of the antlers of this species was figured and described by Blyth (J. A. S. Bengal, x. fig. 7 of pl. facing p. 750, 1841) and subsequently stated by this author in the same journal (vol. xxx. p. 188, 1861) to have belonged to the animal of which a sketch was sent to Cuvier. They were judged by Blyth to have been produced by a stag in its third year. It will be noticed, however, that neither antler of the pair has a trez tine; and since in the Red Deer this tine normally, at all events, appears in the antlers of the third year, one would expect it to be present in a specimen of *C. wallichii* of that age. It will also be seen that in the left antler figured by Blyth, the beam is straight and terminates in a single spike, while in the right antler the beam is forked and much more curved. The want of symmetry between the two in these and other particulars, coupled with the absence of the tines mentioned, forcibly suggests to me degeneration with age. It is, at all events, quite clear that these antlers were not those carried by the stag at the time the figure sent to Cuvier by Duvaucel was drawn. They were probably a later growth and still more decadent. Even the right antler was less curved than were those of the type, as figured; and although the basal juxtaposition and mutual divergence of the brow and bez tines were much the same in the two cases, the angle of their divergence from the beam was in both instances much smaller. But, although these differences and resemblances between the two sets of antlers are interesting, I do not think they afford much clue to the affinity of *C. wallichii*, since these antlers were, in my opinion, obviously degenerate.

The specimen the Society has just received is a comparatively large Stag, though not approaching a Wapiti in size. It stands about 4 ft. 3 ins. (just under 13 hands) at the shoulders. It has a long face, a small sleepy looking eye, and its longish ears

* The italics are mine.—R. I. P

differ from those of all living Deer that I have seen in having the upper edge markedly sinuous (emarginate) towards the tip. The hairs on the neck and throat are longer than elsewhere and constitute a small mane. The tail is quite short, the legs strong, the hoofs rather broad and the metatarsal tuft a little below the hock. The colour (in March) is remarkably pale, being a tolerably uniform yellowish or sandy-brown all over, except on

Text-fig. 67.

Cervus wallichii.

The King's specimen shortly after its arrival at the Gardens in March.

the forehead where the matted hair is browner, on the cheeks and the backs of the ears which are greyer, and on the muzzle and chin which are pale fawn with an indistinct darker patch at the corner of the mouth. The backs of the thighs are white, the pale portion of the rump being only as wide as in the Hangul or Kashmir Stag, but from the level of the ischia the white bends sharply forwards and extends nearly as far as

the summit of the croup, forming a very large pure white disk without trace of median dividing dark line. Upon the croup this disk is not emphasized by a bordering of darker hairs; but below the level of the tail, the white on the back of the thighs is set off by a margin of brown. This disk, so far as size is concerned, differs from that of the Wapiti in being narrower below, its width on each side on a level with the tip of the tail only equalling the width of that organ, whereas in the Wapiti the disk at this point is equal to twice the width of the tail.

It is also noticeable that the hairs adjoining the croup-disk are quite white at the base, so that if they were elevated or deprived of the yellowish-brown pigment of their distal portions, a far larger white rump patch would be displayed than is normally the case. None of the hairs show signs of speckling apically or elsewhere, and their concealed portion is greyish brown on the body, though darker on the neck. Both on the body and over the croup a very large number of them are curled forwards apically, like those on the croup of the type specimen of *C. wallichii* as described by Cuvier, but a mounted specimen of the Kashmir Stag in the British Museum shows, to a lesser degree, this same peculiarity, which is no doubt a sign of old hair.

The antlers, which were shed early in March on the voyage from India, are short but massive. The right one is abnormal, the left probably normal but, possibly, reduced in size from age degeneracy. Both are brown with pale tips to the tines. In the left antler the burr is short, the brow tine rising about an inch above it. This tine is about $8\frac{1}{2}$ inches long, projects nearly horizontally forwards and is bent slightly down just before the tip. The bez tine is straight, about half an inch shorter than the brow and diverges from it at an angle of about 45°, their basal separation being about 1 inch. Just above the root of the bez on the inner side there is a short snag. Beyond the bez the beam curves gently outwards and upwards for about $7\frac{1}{2}$ inches to the origin of the trez, which is about 7 inches long and lightly curved, and lies in approximately the same plane as the bez and brow tines. Above the trez the beam ascends, showing upon the anterior aspect a slight inward inclination, but from the external profile view it exhibits a decided inclination backwards with a light upward curve, its axis lying almost at an angle of 45° to that of the trez, and forming a very obtuse angle with the lower part of the beam, there being a marked concavity behind the root of the trez. It terminates above in two tines, one short and erect and continuing the line of the beam, the other twice as long and inclined upwards and inwards.

The antler is thus five-pointed. It resembles the antlers of the typical specimen in the basal juxtaposition and marked divergence of the brow and bez tines, but, apart from the presence of the trez tine, differs from them in the more upward curvature of the basal part of the beam, which is thus inclined at sharper angles to the axis of the brow and bez tines. In this

latter particular, however, the antlers figured by Blyth are intermediate between those of the example figured by Cuvier and the one just described.

Text-fig. 68.

Cervus wallichii.

A. Anterior aspect of the shed antlers.
B. External aspect of left antler.

In the right antler the brow and bez tines resemble those of the left antler; but above the bez the beam bifurcates into

anterior and posterior branches; the former, occupying almost the position of the trez in the normal antler, is stout, 15 inches long, evenly curved upwards and outwards and two-tined, one tine being short and forwardly directed, the other, which is terminal, being long and lightly curved upwards, backwards and inwards. This branch may be described as an attempt at a reduplication of a normal beam. The posterior branch is thinner than the anterior and ascends with an even curvature upwards, outwards and then inwards, to terminate in two tines, an external which is merely a short bud, and an internal which follows the line of the beam without showing any marked inward inclination, although it clearly corresponds to the inwardly inclined terminal tine of the left antler.

Judging from their small size and asymmetry, these antlers may be decadent; but, if so, the left antler has suffered less than the right from that process and less than those of the type specimen of *C. wallichii* described above. Still I do not think it safe to infer that this left antler resembles that of a stag of this species in full vigour. The possibility, however, must be borne in mind.

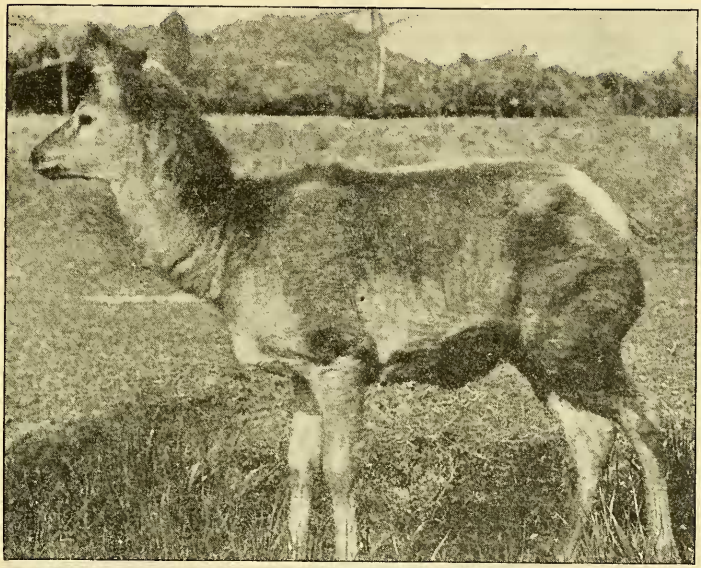
Of the exact geographical area inhabited by *C. wallichii* we have at present no trustworthy information. The type of the species in the Barrackpore menagerie was said by Hardwicke (Tr. Linn. Soc. xiv. p. 581, 1823) to have been brought from Muktinath, away to the north of Dwalagiri in Central Nepal. The example now in the Gardens was presumably in captivity in Nepal, since it was presented to King George by the Maharajah of that country (see note below).

The only other Stag, known to me, which seems to belong to this species is the one which Mr. Lydekker identified from a photograph as *C. affinis* (P. Z. S. 1909, p. 599, fig. 182). This, too, was a captive animal and was alleged to have come from Sikhim. I judge from the size of the rump patch that this stag belongs to *C. wallichii*. Mr. Lydekker described the colour as "very like that of the Hangul with a large white rump-patch." This seems to be correct so far as the size of the rump-patch is concerned; but if the colour of the body was inferred from the photograph, the inference is untrustworthy since the camera is notoriously deceptive in accurately indicating the differences between dark and light tones * (text-fig. 69).

* [*Note added June 1st*, 1912.]—While this paper was in the printers' hands Mr. Lydekker wrote to the 'Field' (May 11th, 1912), on behalf of Col. J. Manners-Smith, to say that the Stag represented by the photograph above discussed is the same individual as the one presented to the King by the Maharajah of Nepal. The history of this animal was recorded by Col. Manners-Smith in the 'Field,' July 31st, 1909, p. 239. It came from the upper reaches of the Sanpo Valley, close to Lake Mansarowar, where it was captured as a fawn, and was in its second year in 1909. It is therefore in its fifth year at the present time, and is not, as I supposed, an old animal. That the colour was the same three years ago as now may be inferred from Col. Manners-Smith's reference to it as "very light." As regards the distribution of the species, reports stated that the deer was plentiful in various places in Western Tibet, near the source of the Brahmaputra River, the hills north of Mount Kailas,

Since then the only known specimens belonging, or presumably belonging, to *C. wallichii* were menagerie animals, no confidence can be placed in their alleged localities.

Text-fig. 69.



Cervus wallichii.

The photograph, forwarded to Mr. Lydekker, of the specimen shown in text-fig. 67 (p. 561).

For a variety of reasons, into which it is needless to enter, *C. wallichii* has hitherto found no abiding place in the chronicles of the Cervidæ. Some authors have added its name to the synonymy of the Kashmir Stag *Cervus hanglu* (= *cashmeriensis*), others have supposed the Stag to be identical with *Cervus affinis*; others have left it as indeterminable. To settle, as far as may be, its status and affinities it is necessary to examine in some detail the characters of the two above mentioned species with which it has been confounded, and of certain other Stags belonging to the same group of the genus *Cervus*.

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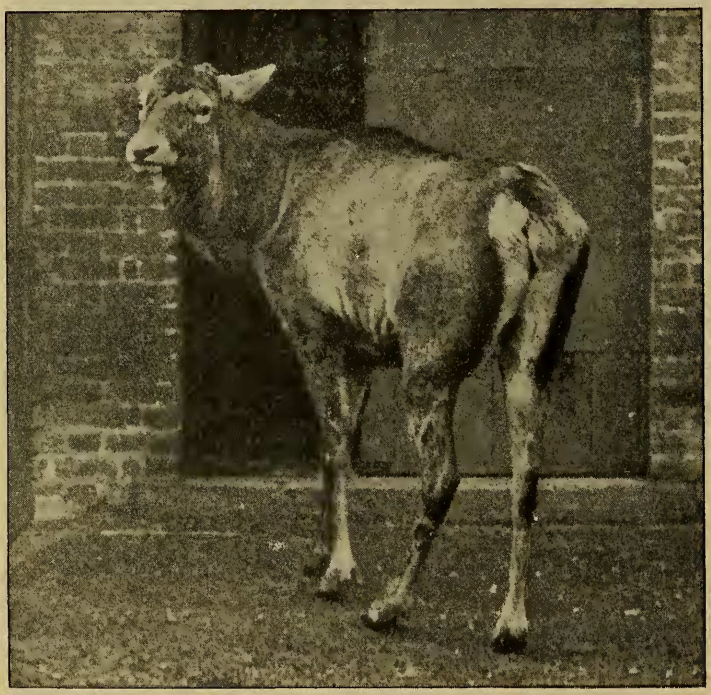
and other less well-known localities being mentioned; the available evidence indicating, in Col. Manners-Smith's opinion, that the species does not cross the southern watershed of the Brahmaputra and is not found in Nepalese territory. He suggested, therefore, that the original specimen of *C. wallichii* had been brought to Muktinath from somewhere in Western Tibet round about Lake Mansarowar. It may be added that Col. Manners-Smith, apparently unaware of the discrepancies between the descriptions of *C. wallichii* and *C. affinis*, believed these two forms to be identical.

Cervus hanglu *, better but wrongly known as *cashmeerianus*, is a not uncommon Stag. Moderately good figures of it have been published by Dr. P. L. Sclater (Tr. Zool. Soc. vii. pl. 30, 1870), and by Mr. Lydekker (Deer of all Lands, pl. iv.), while there are several photographs in existence of specimens that have been exhibited in the Gardens or kept at Woburn. One recently

Text-fig. 70.



Cervus hanglu.

Specimen, living in the Gardens in March, to show the resemblance of the caudal disk to that of *C. affinis*, as described by Hodgson.

published in the 'Field,' Dec. 30, 1911, shows very clearly the shape and extent of the caudal disk characteristic of the species. The white on the inner side of the back of the thighs extends a short distance upwards above the root of the short tail, but the

* Wagner in Schreber's Säug. iv. p. 352 (note), 1843. Various modifications of the word *cashmeerianus* are also in use; but of these *cashmeriensis* appears to be the oldest, since it was first introduced by Leith Adams in connection with a description of this species (P. Z. S. 1858, p. 529).

yellowish or dirty-white right and left moieties of this area do not meet in front of the base of that organ but are separated by a median brown band, continuous with the colour of the back; this band may or may not run along the middle of the tail itself. Thus the caudal disk is small, smaller in fact than in most Deer of the Elaphine group. Nevertheless it is very conspicuous by reason of the blackish setting formed by the adjacent hairs of the hind quarters. So far as my experience of two specimens goes, this caudal disk does not vary appreciably with the season, but remains fairly constant in extent, shape and distinctness. Nor does it alter with age, judging from the fact that in a very old animal with worn teeth, which was recently shot in the Gardens for senile decay, the disk was exactly like that of a younger animal in perfect condition now on exhibition. No doubt, however, it exhibits a certain amount of individual variation. It will thus be seen that *C. hanglu* may be at once distinguished from *C. wallichii* by its totally dissimilar caudal disk *.

It is also darker in colour, being very decidedly brown but fading to a rather paler hue on the flanks, which are lighter than the legs, the latter being as brown as the back both externally and internally. The coat, moreover, is markedly speckled owing to the presence of a subapical pale annulus on the individual hairs.

Another very noticeable distinction between all the specimens of *C. hanglu* and the one example of *C. wallichii* that I have seen is in the colour of the hairs about the mouth. The chin and lower lip of *C. hanglu* are white and the upper lip up to the nostrils is cream or dirty-white, so that the muzzle is rather sharply contrasted in colour with the browner hue of the rest of the face. Light rings round the eyes, too, are very marked. They are not so marked in *C. wallichii* and, as has been stated, the muzzle and chin are decidedly fawn-coloured and darker than the rest of the face at least in the winter coat.

Cervus affinis Hodgson was based upon the skull and antlers of a Stag wrongly alleged to have come from the Sâl forests in Nepal (J. A. S. Bengal, x. pt. 2, pp. 721–724, pl., 1841). The brow tine was long, projected forwards over the face and was straight or had a sharply upturned tip. The bez was subequal and subparallel to it and also had an upturned tip, the distance between their points of origin being $2\frac{1}{2}$ inches. Above the bez the beam reclined backwards and outwards for a short distance, then bent sharply upwards below the origin of the trez and ended in a pair of subequal terminal tines. This sharp upward bend of

* Blyth, who believed the Kashmir Stag and *C. wallichii* to be specifically the same, explained away this difference by assuming that the caudal disk in the figure of the type of *C. wallichii* was exaggerated (J. A. S. Bengal, xxx. p. 188, 1861).

the beam, obvious both in profile and front view, is absent in the known antlers of *C. wallichii*.

In the J. A. S. Bengal, xix. p. 466, pl., 1851, Hodgson figured and described another pair of antlers sent to him by Dr. Campbell from Ding-cham, north of Sikhim. These he referred to *C. affinis*; but they only serve to illustrate the variability to which the antlers are liable.

Subsequently (J. A. S. Bengal, xx. pp. 388–394, pl. vii., 1851) Hodgson redescribed the species "from abundant supplies of the spoils [also sent by Dr. Campbell] . . . . . exhibiting both sexes in various states of maturity . . . . . the skulls and leg-bones being attached to the majority of the specimens." He thus had at his disposal what he described as "unusually copious and adequate material." This is an important point to remember.

The description of the antlers given in this paper agrees tolerably closely with that which he published in 1841. Certain individual variations are pointed out, and it is stated that the basal interval between the brow and bez tines varies from two to over four inches, two being the usual distance.

After remarking that the specimens were in winter coat, having been killed in February, Hodgson described the colour as "earthy brown, more or less lutescent, the head and neck being concolorous with the back; but the flanks are conspicuously paled, and the belly as conspicuously darkened . . . . . the neck, though paler below than above, is not very noticeably so. But the paling of the flanks is as decidedly so as the nigrescence of the belly; the white and black forming a conspicuous contrast on these parts . . . . . The limbs are paler than the back, darker than the flanks and they have an earthy-brown list down their external and anterior aspect."

Finally he said, "The tail is very short, and *the caudal disc remarkably small but conspicuous from strong contrast of colours.*" In another place he also spoke of "*the small caudal disc*," adding "*The little tail is white, like its disc, a dark mesial line dividing the latter along the culmenal* (sic) *line of the tail.*" *

This description of the small caudal disk with its median dividing dark line extending on to the tail applies tolerably accurately to the caudal disk of *C. hanglu*; and if Hodgson's published figure, bad though it be, of *C. affinis* be compared with those of the former species published by Mr. Lydekker and Dr. P. L. Sclater, it will be seen that the principal differences between the two species lie in the form of the antlers and the rather larger caudal disk with narrower median line in *C. affinis*. Taking Hodgson's description as a whole, however, it amply justifies and explains Blanford's statement (Mamm. Brit. India, p. 537) that the coloration of the two species is the same, and equally discredits Mr. Lydekker's assertion that "as regards

* The italics in this paragraph are mine.—R. I. P.

coloration [of *affinis*] accurate information is wanting" (Game Animals of India, p. 217, 1907).

The precise nature of the relationship, however, between the two species is by no means so easily and certainly settled as the literature seems to indicate.

In the British Museum there are three skins and a mounted head referred to *C. affinis*. The head and one of the skins came from Hodgson, the former being labelled "North of Bhotan," the latter "North India" and bearing the date 1857. It is not certain, so far as I know, that these specimens are part of the material that author described in 1851. Very possibly they are. If so, the head is very much faded—which is likely enough considering that it is exhibited in the gallery—because it is now a tolerably uniform sandy fawn and not "earthy brown." It is noticeable, however, that the lips and chin are fawn-coloured as in the example of *C. wallichii* in the Gardens, and not white as in *C. hanglu*. The skin, on the contrary, which has not been exhibited, agrees fairly well with Hodgson's description, being for the most part dirty brown and much darker both on the body and legs than is our specimen of *C. wallichii*. The hair, moreover, is very coarse and is of winter growth. The tail is cut away; but the white disk is not nearly so distinctly divided mesially as Hodgson's description would lead us to believe, nor as is the case in *C. hanglu*. Remnants of a brown dividing line are, however, traceable. Again, although the disk is smaller than in *C. wallichii* and is set off by a margin of darker hairs, the bases of these adjacent dark hairs are white, and the disk could be made to approach that of *C. wallichii* in size if the brown tips of these hairs were removed or deprived of pigment. But be it remembered, the bases of the hairs adjoining the croup-disk in our example of *C. wallichii* are also white, so that the disk of the latter is actually, with the hair undisturbed, as large as, or larger than, the disk in Hodgson's *affinis* with the hairs interfered with in the way supposed. In both specimens the hairs are short and crisp.

The other two skins named *C. affinis* in the British Museum belonged to the late Dr. Blanford and are labelled "Sikkim, L. Mandelli"*. The coat is in a better state of preservation than in Hodgson's specimen above described. The general colour is greyish brown, the hairs being pale basally, brownish distally with a distinct subapical pale annulus, and a darker tip, imparting a marked speckled appearance to the coat. The rump-patch is small and white, but as in Hodgson's specimen, and in Hodgson's published figure of *C. affinis*, it spreads on to the posterior part of the croup in front of the base of the tail. In one of the specimens it is very clearly defined all round by a bordering of brown hairs unspeckled and considerably darker than the back, but with white bases. In the other the hairs bordering

* Dr. Blanford once informed me that Mandelli's localities are untrustworthy.

the patch are only a little darker than the back and are speckled to the edge of the disk. As in Hodgson's skin the tails have been cut away, and the croup-disk has a median abbreviated irregular dark line, much more clearly defined in one skin than in the other. This disk is of about the same size as in Hodgson's specimen, although the hairs of the coat generally are longer and less close and crisped. The legs are paler, being fawn-brown down the front and on the fetlocks, and the lips and chin are also fawn, and not cream and white as in *C. hanglu*.

Reverting once more to the mounted head in the British Museum, it may be added that the left ear shows signs of the emargination of its upper border so evident in the living example of *C. wallichii*. The right ear nevertheless has a straighter upper rim. I suspect, however, that *C. affinis* has the ears shaped as in *C. wallichii*.

Putting all these facts together, it appears to me that *C. affinis* is nearly intermediate in coloration between *C. wallichii* and *C. hanglu*, especially in the general tint of the body and limbs and the size and division of the caudal disk, the most marked character in which it resembles *C. wallichii* and differs from *C. hanglu* being the fawn colour of the lips and chin.

There is evidence also that both *C. wallichii* and *C. affinis* are larger than *C. hanglu* and have longer faces*; but judging by the standard of specific and subspecific differences usually adopted in the Cervidæ, it appears to me to be doubtful whether more than subspecific importance should be granted to the differences above described between *C. wallichii*, *C. affinis*, and *C. hanglu*. It must be remembered, however, that *wallichii* is the oldest name of the three.

Exact particulars of the range of *C. affinis* are much wanted. Only two districts are mentioned by Mr. Lydekker in the table of horn-measurements in Rowland Ward's 'Records of Big Game,' 1910 (p. 38), namely, the Tibetan Frontier and the Choombi Valley; but the valleys of Bhotan near the Choombi are added under the diagnosis of the species. The Stag has also been recorded by Col. H. A. Iggulden from the Tsan-po basin, near Lhasa ('Field,' Oct. 1906, p. 736); but whether the specimens were accurately determined or not, it is impossible, without the evidence of skins, to say.

Another Stag belonging to this same group is the animal from Szechuen described by Mr. Lydekker as *C. cashmirianus macneilli* (P. Z. S. May 11, 1909, p. 588, pl. lxix.). The coat is finely speckled all over owing to the apical annulation of the hairs, as in Mandelli's skins of *C. affinis* and as in fresh-coated examples of *C. hanglu*; the prevailing colour, however, is strikingly grey, especially on the sides and legs, but the back is rather darker,

* This difference is very noticeable between the examples of *C. hanglu* and *C. wallichii* living side by side in the Gardens.

that is to say more fawn, than the sides, and the top of the head, the face, and the nape of the neck are browner than the back. There is no mane and the neck shows signs of coat change. The legs are less distinctly speckled than the sides of the body and are darker in front than behind. The belly is whitish, as in the females of *C. affinis* described by Hodgson. Apart from the prevailing greyness of the pelage, the most interesting features about this Stag are the brownish fawn colour of the chin and lips

Text-fig. 71.

Cervus macneilli.

Photograph of the plate of the type-specimen (P. Z. S. 1909, pl. lxix.).

and the coloration of the rump. The upper side of the tail is black with a narrow edging of white. On each side of the tail there is a narrow white area, which however barely surpasses the root of that organ dorsally. This white area is bordered with black, and there is a blackish-brown unspeckled croup-disk almost as extensive as the white croup-disk of *C. wallichii*.

From the distribution of this Stag, its affinities might be inferred to be rather with *C. affinis* than with *C. hanglu* ; and in

spite of the lesser extent of the white on the rump, a feature in which it more resembles *C. hanglu*, this conclusion is borne out by the coloration of the chin and lips and by the shape of the ears, which are pointed and appear to have had a sinuous upper edge.

Moreover, as Mr. Lydekker records, Capt. McNeill declared the Stags of this kind that he saw in Szechuen to be nearly as large as Wapiti. Even making allowance for exaggeration in this estimate, the animals must have been of considerable size. *C. hanglu*, however, is not a large Stag, although strongly made and "cobby" in build.

Unfortunately, there is no record of the date when the type specimen of this Stag, a young hind standing, as mounted, forty inches, was shot.

Another type of this group of Stags is represented by a skin and skull kindly lent to me for identification by Mr. W. F. H. Rosenberg, F.Z.S. The animal, an adult hind, was shot by Dr. J. A. C. Smith on March 23rd, 1911, 30 miles S.E. of Tao-chou, Kansu, in China, at an altitude of 11,000 feet.

The colour is a tolerably uniform earthy brown relieved by fine close-set speckling due to a subapical pale annulus on each hair. On the sides the main shaft of the hairs is greyer and less brown than dorsally, and low down towards the belly the subapical annulus is longer, so that the general tint is markedly paler. The belly is white, but not the chest. On the neck the hairs are longer with longer apical annulus, the shaft of the hairs being browner along the nape than on the sides of the neck, so that there is an ill-defined dorsal neck-stripe as in *C. macneilli*; the front of the neck (throat) is paler than the sides; the legs are fawn-brown down the front and sides, paler behind. The forehead is brown, the face grey-brown and closely speckled; the lips and chin are fawn-brown, unspeckled and without white, and the black patch below the corner of the mouth is well marked. There is a blackish-brown unspeckled croup-disk, as in *C. macneilli*, and the hairs of this disk become gradually more and more white towards the root of the tail*. The white on the buttocks is of the same extent approximately as in *C. macneilli*, but the tail itself is much whiter than in that animal, since it merely has a narrow median dark stripe as in most examples at all events of *C. hanglu*. The ears are long and pointed, with apparently a sinuous upper edge such as is seen in *C. wallichii*.

The following measurements in the flesh, taken by Dr. Smith, may be of future use, although at the present time they indicate nothing, because there are no corresponding measurements of other deer wherewith to compare them :—

Head and body 1745 mm. (a little under 6 feet; tail 145 mm.

* This is probably also the case in *C. macneilli*, but I was unable to touch the mounted specimen of the animal in the British Museum.

(under 6 inches); foot (? hock to heel) 525 mm. (21 inches); ear 225 mm. (9 inches). The skin is too shrunk to make an estimate of the animal's height of any value.

The skull and teeth show that the specimen was a full-grown, but not old, hind. Its basal length from the notch between the condyles to the tip of the premaxillæ is $13\frac{3}{4}$ inches (about 344 mm.); and the length from the anterior edge of the orbit to the tip of the premaxilla about 9 inches (=225 mm.), and the width across the orbits $6\frac{1}{4}$ inches (=156 mm.).

On comparing these dimensions with those recorded by Blanford for *C. hanglu* and *C. affinis*, it would appear that this Kansu Stag is somewhere about the size of the former. For example, he quotes the length of the Hangul (probably of males) as from 7 to $7\frac{1}{2}$ feet and the length of a skull of this sex as just over 15 inches. Probably the basal length of the latter would be about $14\frac{3}{4}$ inches.

The smaller of two skulls of *C. affinis* had a basal length of $16\frac{1}{4}$ inches and a width across the orbits of about $7\frac{1}{3}$ inches. Thus, allowing for the fact that the Kansu specimen is an adult female, it may be inferred that the males are about as large as those of *C. hanglu* and considerably smaller than those of *C. affinis*.

The description given above of the colour of this Stag agrees in a general way tolerably closely with that of the examples of *C. affinis* that Hodgson had in his hands, and it is important to remember the close correspondence in date, Hodgson's specimens having been killed in February and the Kansu specimen in March; and since deer of the Elaphine group moult in April and May, it is evident that the examples in question were still carrying their winter coats. In their generally dark earthy brown coloration, both differ markedly from the living example of *C. wallichii* in March.

The coloration of the Kansu specimen, however, is not identical with that of *C. affinis*. I do not think it safe on the evidence of one skin to trust much to the greater uniformity of the colour of the body as shown by the absence of a distinct darkening of the back and "lutescence" of the sides to which Hodgson refers in *C. affinis*, but the large size of the dark croup-patch and the smaller extent of white at the base of the tail are probably more dependable. It is in both these particulars especially that the Kansu stag resembles the Szechuen stag *C. macneilli*. Since, however, it differs from the latter in general coloration and in the greater amount of white in the tail; from *C. affinis* in having no white above the root of the tail and a larger dark area on the croup; from *C. wallichii* in having no white on the croup at all, except such as is concealed by the overlying black ends to the hairs; and from *C. hanglu* in the dark colour of the chin and upper lip, the Kansu stag seems to deserve a name; and I propose to call it C. KANSUENSIS.

The following analytical key to the species above discussed represents my views as to their probable affinities :—

a. Chin and lower lip white, muzzle pale fawn, markedly lighter than the rest of the face; ears bluntly pointed and with straight upper rim; no white on croup above root of tail ... *hanglu* Wagn.

a'. Chin fawn or brown, muzzle brownish fawn with at most a little white on the lip in front; ears long and pointed with sinuous upper edge (? in *affinis*).

b. White on back of thighs not spreading on to croup above root of tail; tail dark down centre; a large blackish-brown croup-patch reaching nearly or quite to the summit of the croup.

c. Prevailing colour grey, rather darker on the back and still darker on the head; practically the whole of the upper side of the tail black ..... *macneilli* Lydd.

c'. Prevailing colour (March) brown; upper side of tail with an irregular median dark stripe..... *kansuensis*, nov.

b'. White on back of thighs spreading upwards above the root of the tail and encroaching more or less on the croup; dark patch on croup smaller or absent.

d. White area above the tail comparatively small with a more or less distinct median dark longitudinal stripe; prevailing colour (February) earthy brown, paler laterally ..... *affinis* Hodgs.

d'. White area above tail very large, reaching summit of croup and undivided by dark line; prevailing colour (March) pale fawn-brown..... *wallichii* Cuv.

In selecting the colour of the chin and muzzle as the character for eliminating *C. hanglu* from the rest of the species, I am not unmindful of the fact that Cuvier wrote of *C. wallichii* "comme l'ordinaire, le tour de l'œil, celui de la bouche, sont plus pâles, et il y a du blanc sous la mâchoïre et une tache noire sous l'angle des lèvres." These words may suggest that the muzzle and chin were coloured as in *C. hanglu*; but the coloured plate of *C. wallichii*, from which the description was taken, does not bear out this supposition nor does it quite justify Cuvier's phraseology, for the lips and chin are washed with the same yellowish tint as that of the rest of the body.

If the caudal disk were taken as the primary basis for the classification of the species, they would be grouped as follows:— *C. macneilli*+*C. kansuensis*; *C. hanglu*+*C. affinis*; *C. wallichii*. I prefer on the whole to regard these forms as species rather than subspecies because we have at present no proof that they intergrade, and the differences between them are perhaps greater than those between the various races of Wapiti (*Cervus canadensis*) and Red Deer (*Cervus elaphus*). As a group they resemble the Wapiti and differ from the Red Deer in the shortness of their tails.

The only other Stag which should perhaps come into the same category, judging from the shortness of the tail, the size of the caudal disk, and the shape of the ears, is the Tibetan species commonly known as *C. albirostris* which Blanford described as *C. thoroldi* (P. Z. S. 1893, p. 444). Judging from the mounted specimen of this stag in the British Museum the coloured figures of this species published by Blanford and by Mr. Lydekker

('Deer of all Lands,' pl. v.) have the yellow caudal disk too large and extending too high up the croup, and the ears, which are really very long and pointed, with the upper edge sinuous, represented as much too short and blunt. In the whiteness of the chin and muzzle this species goes a stage beyond *C. hanglu*; but of course the stag differs from those discussed in this paper by the reversal of the hairs along the spine between the croup and withers and, so far as is known, by the absence of the bez tine.

In the above given table no use has been made of the antlers as distinguishing features. These vary so much with age and from a variety of unknown causes that I am convinced too much confidence is placed in them in most systematic treatises on Deer*. At the same time it may be useful to bear in mind that the recorded antlers of *C. wallichii* appear to differ from average antlers of *C. hanglu* and *C. affinis* in the basal juxtaposition and marked distal divergence between the brow and bez tines, and at least from those of *C. affinis* in the comparative straightness of the beam which lacks the sharp upward curvature of its distal half. It will be highly interesting to see if the example of *C. wallichii* now living in the Gardens grows, under the changed conditions of its existence, antlers resembling those that it shed on its journey from India. This and the colour of its summer coat I hope to have the chance of recording later on.

As regards the stature of the Deer described above, Blanford gave the height of *C. hanglu* as ranging from 48 to 52 inches. The example of this species now in the Gardens is barely 48 inches. *C. affinis*, according to Hodgson, stands from 54 to 60 inches and thus rivals a Wapiti in stature. A small Canadian stag Wapiti now in the Gardens is about 56 inches, and an example of *C. xanthopygus* 58 inches. But since Hodgson's measurements of *C. affinis* were taken from dried skins, his estimate must have been largely guess-work and probably erred on the side of exaggeration than otherwise. Blanford, or the authorities from whom his information was derived, measured in all probability freshly killed specimens of *C. hanglu*; and since dead animals give higher stature-measurements than living ones, exaggeration in connection with this species must also be allowed for.

Our living example of *C. wallichii* is as nearly as possible 51 inches, and is manifestly much smaller than any stag of the Wapiti group, whether American or Asiatic, that I have seen. It is, however, exactly the height assigned by Hardwicke to the typical example of this species that was exhibited in the menagerie at Barrackpore.

* I can see no reason for adopting Mr. Lydekker's suggestion ('Field,' May 11th, 1912) that the Stag he described from a pair of shed antlers picked up in Szechuen as *Cervus canadensis wardi* (P. Z. S. 1910, pp. 987–989) is identical with *Cervus wallichii*.